MULTIMEDIA UNIVERSITY

SUPPLEMENTARY EXAM

TRIMESTER 1, 2015/2016 SESSION

TSN 2201/TCE 2321 – COMPUTER NETWORKS
(All Sections / Groups)

17 NOV 2015
9.00 AM – 11.00 AM
(2 HOURS)

INSTRUCTIONS TO STUDENTS

1. This Question paper consists of 9 printed pages including cover page with 6 questions only.

2. Attempt **FIVE** out of **SIX** questions. All questions carry equal marks and the distribution of marks for each question is given.

3. Please write all your answer in the Answer Booklet provided

Question 1

(a) How many energy levels are there based on the following time domain plot and how many bits can be carried by each energy level? [2 marks]
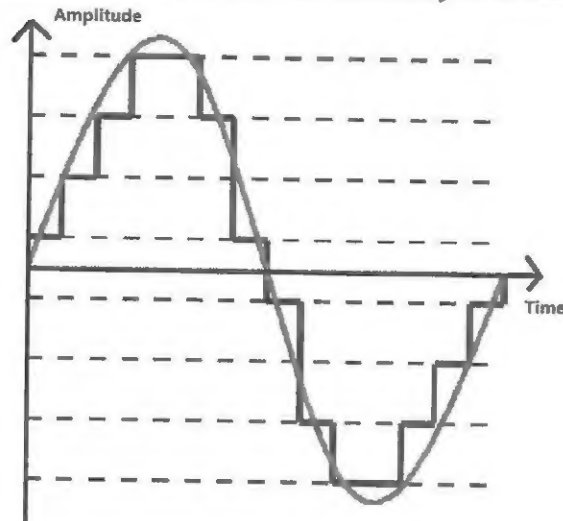

(b) Explain the following cable specification. [3 marks]
100BaseT

(c) What happen if a ray of light travels through one substance suddenly enter to another medium which is more or less dense? What is the angle of the light ray in order to achieve total reflection in fiber optics? [2 marks]

(d) What is the main characteristic of radio waves that makes them useful for multicasting, e.g. TV, FM radio? [1 mark]

(e) Name two wireless media that need line of sight propagation. [2 marks]

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Question 2

(a) State the network topology used in the figure below. [1 mark]
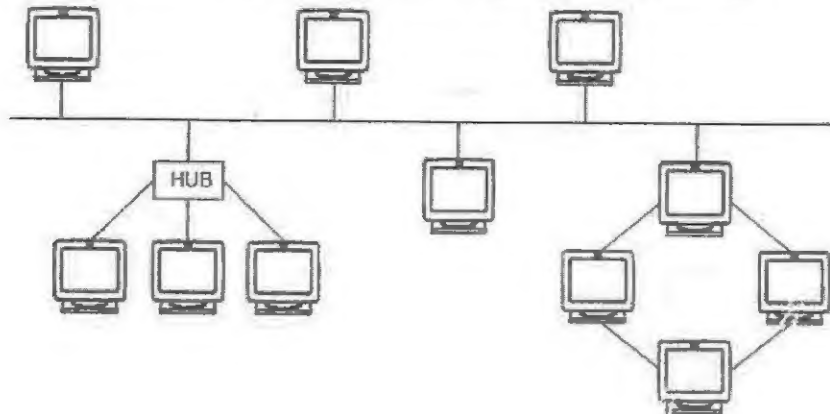

(b) Define multipoint connection. Explain how devices use a multipoint connection to access a medium. [2 marks]

(c) What is the number of connections needed in a mesh topology with 6 workstations? [1 mark]

(d) What are the two advantages of using a bridge to divide a network into segments? [2 marks]

(e) If the following network is able to support up to 10Mbps, what is the ideal bandwidth offered by each port of the following switch if full duplex transmission is enabled? Justify your answer. [2 marks]
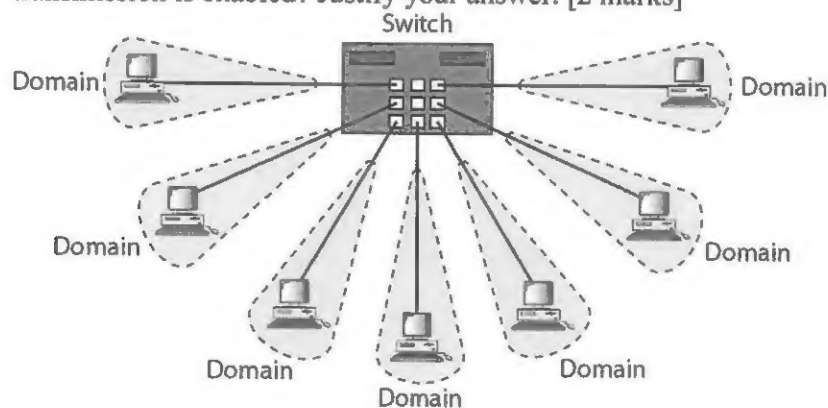
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(f) The following figure shows the flow diagram of CSMA/CA. What are the methods used by CSMA/CA to avoid collision? [2 marks]
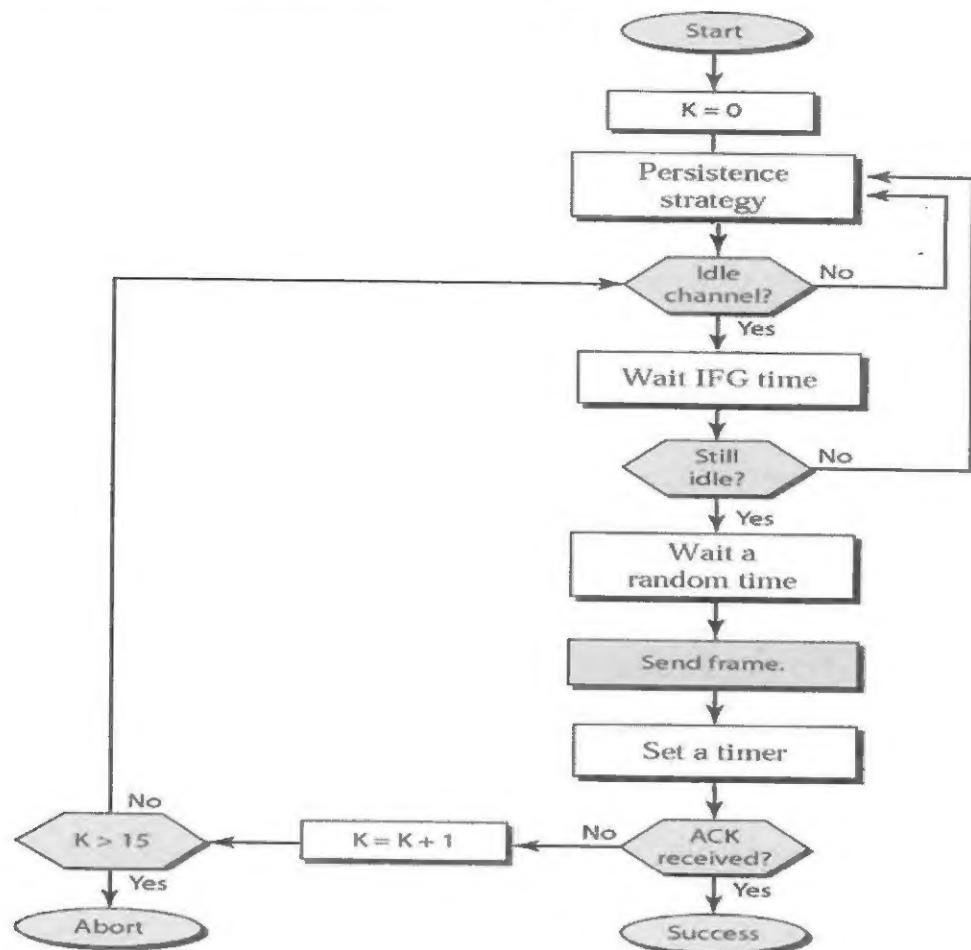
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Question 3

(a) Every host or device on the Internet requires a unique IPv4 address. But why PCs that use private IPv4 addresses in the MMU campus are able to access the Internet without any problem? [1 mark]

(b) Accessing the Internet using devices no longer require manual setting of IPv4. How is this possible? [1 mark]

(c) What is routing? [2 marks]

(d) Is next hop routing still possible for network nowadays? Why? [2 marks]

(e) Suggest two methods to solve the problem in (d). [2 marks]

(f) Name route (i) and (ii) in the following figure. [2 marks]

Routing Table	Mask	Destination address	Next-hop address	Interface
	/8	14.0.0.0	118.45.23.8	m1
(i) →	/32	192.16.7.1	202.45.9.3	m0
	/24	193.14.5.0	84.78.4.12	m2
(ii) →	/0	/0	145.11.10.6	m0

Question 4

There are six parties involved in this security protocol over a shared LAN connection where all parties can listen to the channel. The details are shown in table below.

Parties	Public Key	Private Key	Sender Msg (plain text)	Share Key
Ali	PubKeyAli	PrivKeyAli	MsgAli	See definition below
Balan	PubKeyBalan	PrivKeyBalan	MsgBalan	
Chong	PubKeyChong	PrivKeyChong	MsgChong	
Doris	PubKeyDoris	PrivKeyDoris	MsgDoris	
Elanie	PubKeyElanie	PrivKeyElanie	MsgElanie	
FAMA	PubKeyFAMA	PrivKeyFAMA	MsgFAMA	

The definition of MsgXXX, MsgAli meant Ali send out a plain text message.

The definition of ShareKey is like this
ShaKeyAli_Balan means that this key is shared by Ali and Balan. Only Ali and Balan know the key.
ShaKeyAli_Balan_Doris means that this key is shared by Ali, Balan and Doris. Some of the algorithms used are SHA-256, AES, DES, MD5, RSA and Diffie-Hellman.
The word "process" can mean encryption, hashing, signing, verify or key-exchanging.

With these definitions, please answer the questions below.

(a) Ali only needs a secure communication to Chong. Ali and Chong need to have message secrecy and non-repudiation. Name one algorithm that is best suited for Ali and Chong. Note: If you name more than two algorithms, no mark will be awarded. [1 mark]

(b) Ali only needs a secure communication to Chong. Ali and Chong does not care who read their message. However, they do care if someone modify their message. Name one algorithm that is best suited for Ali and Chong. Note: If you name more than two algorithms, no mark will be awarded. [1 mark]

(c) Example Question: Describe a type of message content sent by Ali where only Chong can view the message. Security requirement is secrecy

Example Answer: Ali : "Ah chong , the server password is HJKU657b7"

Describe a type of message content sent by Ali to Chong where the security requirement is to prevent message replay. [1 mark]
Answer: Ali:"   Ah   Chong,   _____(the   message content)_____ "

Continued...

(d) Describe a type of message content sent by Ali to Elaine where the security requirement is non-repudiation. [1 mark]

Answer: Ali:" Elaine, _____(the message content)_____ "

(e) Below is the brief packet format for Original IP packet.

IP header	TCP Header	Data

Draw the brief packet format after the packet is encapsulated with IPSec header in Transport Mode. [2 marks]

(f) Below is the brief packet format for Original IP packet.

IP header	TCP Header	Data

Draw the brief packet format after the packet is encapsulated with IPSec header in Tunnel Mode. [2 marks]

(g) After the IPSec negotiation, both parties agreed to use AES and SHA-256 algorithm. What is the security requirement between both parties? Fill in the blank. [2 marks]

Security Requirement	Yes/No
Message Secrecy	
Message Integrity	
Message Replay	
Non Repudiation of Message	
Denial of Service	

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Question 5

(a) Give two IP multicast addresses which have a MAC address of 01-00-5e-11-22-33. [2 marks]

(b) Explain why a single multicast MAC address of 01-00-5e-xx-xx-xx can represent 32 different IP multicast addresses. [3 marks]

(c) Why the TTL field in IGMP Packet is set to 1? [2 marks]

(d) After successfully pinging PC2, PC1 (192.168.1.1) try to send an IP packet to PC2 (200.1.1.1 web server). However, it received an ICMP destination port unreachable. What type of packet is sent by PC1? [1 mark]

(e) A user (192.168.1.2) accessed PC2 website and found that there is no problem with PC2 website. Describe the problem that caused the generation of "ICMP destination port unreachable" to PC1. [2 marks]

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Question 6

(a) Given these records in a DNS server

Mmu.edu.my	3600 IN NS surat1.mmu.edu.my
Mmu.edu.my	3600 IN MX letter1.mmu.edu.my
Gmail3.mmu.edu.my	3600 IN A 203.106.62.12
surat1.mmu.edu.my	3600 IN A 203.106.62.13
letter1.mmu.edu.my	3600 IN A 203.106.62.14

Which is the email server IP address? [1 marks]

(b) Given two differences between POP3 and IMAP. [2 marks]

(c) Give the difference between Expedited Forwarding (EF) and Assured Forward traffic classes in Differential Services. [2 marks]

(d) Fill in the blank. [2 marks]

HTTP Response Code	Client Error Code, Server Error Code, Successful Code, Redirection Code,
1XX	Informational.
2XX	
3XX	
4XX	
5XX	

(e) Give the difference between FTP Active mode and FTP Passive mode. [2 marks]

(f) Briefly describe the function of Label Distribution Protocol in MPLS. [1 mark]

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